Caustic Burns and Carcinoma of the Esophagus

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A history of caustic injury was obtained in 12 of 846 patients with squamous cell carcinoma of the esophagus. The average age was 52.8 years; the interval from injury to development of carcinoma was 45.8 years. Nine of the 12 carcinomas were in the midthoracic segment. Resection was possible in nine patients, with two surviving over ten years. A survey of reported series with this association confirms the increased resection rate and probability of long survival compared with the usual carcinoma of the esophagus.

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AN INCREASED FREQUENCY of carcinoma of the esophagus with achalasia, and after caustic injury, has long been recognized. The Plummer-Vinson syndrome has also been implicated. Of the many other predisposing factors suggested as important in the development of carcinoma of the esophagus, such as poor nutrition, alcohol abuse, and smoking, the evidence is not definitive.

The purpose of this report is to record experience with patients who sustained chemical injury to the esophagus and later developed squamous cell carcinoma, and to review some of the other reports concerning this association.

Case Reports

Since 1941, when the first resection at this medical center was performed for squamous cell carcinoma of the esophagus, 846 patients with this malignancy have been admitted. Twelve patients had prior caustic injuries to the esophagus, which is 1.4% of the entire series. Facts concerning each patient are shown in Table 1.

The youngest patient was 22 years old; the average age was 52.8 years. Ten of the 12 patients were men. The shortest interval from injury to the development of carcinoma was nine years, the longest 70 years, and the average 45.8 years. Two carcinomas were in the cervical region, one in the lower third of the esophagus, and the remainder in the midportion of the thoracic esophagus. One patient was admitted with a tracheosophageal fistula as well as metastases to nodes in the neck. He died less than a month later. Two patients were treated with orthovoltage irradiation, and one survived nearly two years.

Resection was possible in nine patients. This was palliative in five patients and the longest survival period was eight months. Four patients had what was thought to be curative resection. One returned in six months, died of mesenteric thrombosis, and autopsy showed no residual tumor. The second patient lived 31 months. The third patient died of myocardial infarction 13 years after operation, but autopsy was not performed. The last patient returned to the hospital 14 years after his first resection with recurrence (or a second carcinoma) in the proximal residual esophagus. This could not be resected and he died five months after colon bypass.

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Submitted for publication: March 16, 1981.

Discussion

The first carcinoma of the esophagus after a lye burn was reported by Teleky,[1] in 1904. This was a 22-year-old man who sustained the lye injury at the age of two years. Autopsy examination showed the carcinoma to have eroded into the left main bronchus. Bigelow,[2] in 1953, reported one patient and critically surveyed the previously reported patients, accepting nine. With the two exceptions described below, most reports have been a single case or small series, frequently with brief follow-up information. A number of papers on carcinoma of the esophagus mention the number with earlier caustic injury but provide no further details.

Imre and Kopp,[3] in 1972, reported ten patients with caustic burns. By far the largest series, 63 patients, was described by Appelqvist and Salmo,[4] in 1980. The latter two groups, the report of Bigelow and our series, are summarized in Table 2.

Incidence

In the reported series of carcinoma of the esophagus, a history of caustic ingestion has been noticed in 1–4% of the patients; in our series this was 1.4% and in that of Appelqvist and Salmo 2.6% (63 of 2414 patients). The important number, how many patients with a caustic burn will develop carcinoma, is not available as no large series has been followed. Kiviranta,[5] on the basis of nine patients with carcinoma in a group of 381 with caustic injuries, stated "the possibility that former corrosion patients, who have been afflicted at least 24 years earlier and fall in the age group from 25 to 64, contracted esophageal cancer is approximately one

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thousand fold as compared to other people in the same age group."

Age and Sex

The average age in the usual reported series of squamous cell carcinoma of the esophagus is between 60 and 62 years. As noted in Table 2, the average age in the caustic burn–carcinoma group is about 50 years. The youngest patient was a 15-year-old boy who swallowed lye at the age of three, reported by Kinnman.[6]

As with primary carcinoma of the esophagus, men are more frequently afflicted than women. In our series, the ratio was 5:1, but overall it is approximately 5:4.

Time Interval

The time from the caustic burn to the onset of carcinoma averages about 40 years (Table 2). In our series, the range was 9–70 years.

Why a caustic burn predisposes the patient to carcinoma is unclear. In a few patients, severe injury requiring prolonged bougienage will be accompanied by recurrent ulceration and epithelial healing. This may be equated to other similar situations, such as the increased risk of cancer in chronic ulcerative colitis. Most patients, however, after the initial treatment, are relatively asymptomatic for many years and no apparent other sensitizing factor or events are discernible.

Diagnosis

Recognition of the malignancy presents the same problems encountered in the usual carcinoma of the esophagus. Patients may seek help earlier as they may be more aware of any minor changes in swallowing.

TABLE 1. *Caustic Injury—Carcinoma of Esophagus*

Age	Sex	Age at Injury	Site	Treatment; Result
67	M	10	mid 1/3	none, had TEF; died < 1 mo
48	M	4	mid 1/3	irradiation; died 3 mo
53	M	44	cerv.	colon bypass; irradiation; died 22 mo
76	M	6	mid 1/3	palliative resection; died postop
71	M	4	mid 1/3	palliative resection; died 2 mo
45	F	2	cerv.	palliative resection; died 5 mo
48	M	3	mid 1/3	palliative resection; died 6 mo
35	M	2	mid 1/3	palliative resection; died 8 mo
43	M	3	mid 1/3	curative resection; died 6 mo mesenteric thrombosis
60	F	2	mid 1/3	curative resection; died 31 mo
66	M	2	low 1/3	curative resection; died 13 years myocardial infarction
22	M	2	mid 1/3	curative resection; recurrence 14 years later, colon bypass, died 5 mo

TABLE 2. *Reported Series: Caustic Injury—Carcinoma of Esophagus*

	Bigelow[2]	Imre[3]	Appelqvist[4]	Hopkins
Number patients	10	10	63	12
Average age	35	52	48	53
Average interval (Years)	31.2	40.5	41.5	45.8
Site				
upper	—	2	5	2
middle	—	6	53	9
lower	—	2	5	1
Resection	1	5	20	9

Treatment

Although irradiation has a definite role in treatment, our interest has been in resection. For comparison, in our summary of reported series of over 15,000 patients with carcinoma of the esophagus, the operatability rate was approximately 45%, and, of those explored, 65% of the tumors could be resected. This is about 30% of all patients.

In the collected cases of Bigelow, one of the ten patients had resection, but it should be recalled that this group dated back to 1904. Imre and Kopp performed resection in five of their ten patients. Appelqvist and Salmo explored 24 of their 63 patients (38%) and were able to resect 20 tumors, which is 83% of those explored and 32% of the entire group. In our series, the lesions in nine of the 12 patients were resectable. Combining the latter three series of 85 patients, resection was performed in 40% of the patients, which is slightly better than 30% noted above.

One caveat concerns the level of anastomosis, whether after resection or bypass. Our experience suggests that even in the absence of an obvious stricture, minor changes in the esophagus may lead to anastomotic stricture so the level of anastomosis should be reasonably high in the cervical region.

When a bypass operation is required for an intractable stricture due to caustic burn, the question of resection of the esophagus to prevent carcinoma arises. The consensus is that no resection should be performed, as the postoperative mortality rate is thought to be higher than the chance of developing cancer. We are inclined to agree, although valid statistics are not to be found to prove this.

Results

Appelqvist and Salmo noted a better prognosis for lye corrosion carcinoma compared with ordinary esophageal cancer. They suggest the following may be responsible: 1) lye corrosion carcinoma patients are younger, 2) obstructive symptoms occur sooner in an

already narrowed esophagus, and 3) the lye stricture is surrounded by scar tissue which prevents early dissemination of carcinoma.

Few long-term results are available. Appelqvist and Salmo reported that 15 of their patients survived operations and five of these lived over five years, as did two of the 23 radiation-treated patients. As shown in Table 1, two of our patients had long survival rates.

Prevention

Earlier diagnosis would be desirable, but the possibility of following every patient with a caustic burn for periods exceeding 50 years seems unrealistic if for no other reason than many are in the socioeconomic group least likely to be compliant. Hopefully, then, the frequency of accidental ingestion of substances, such as lye by children, will continue to decrease.

References

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